



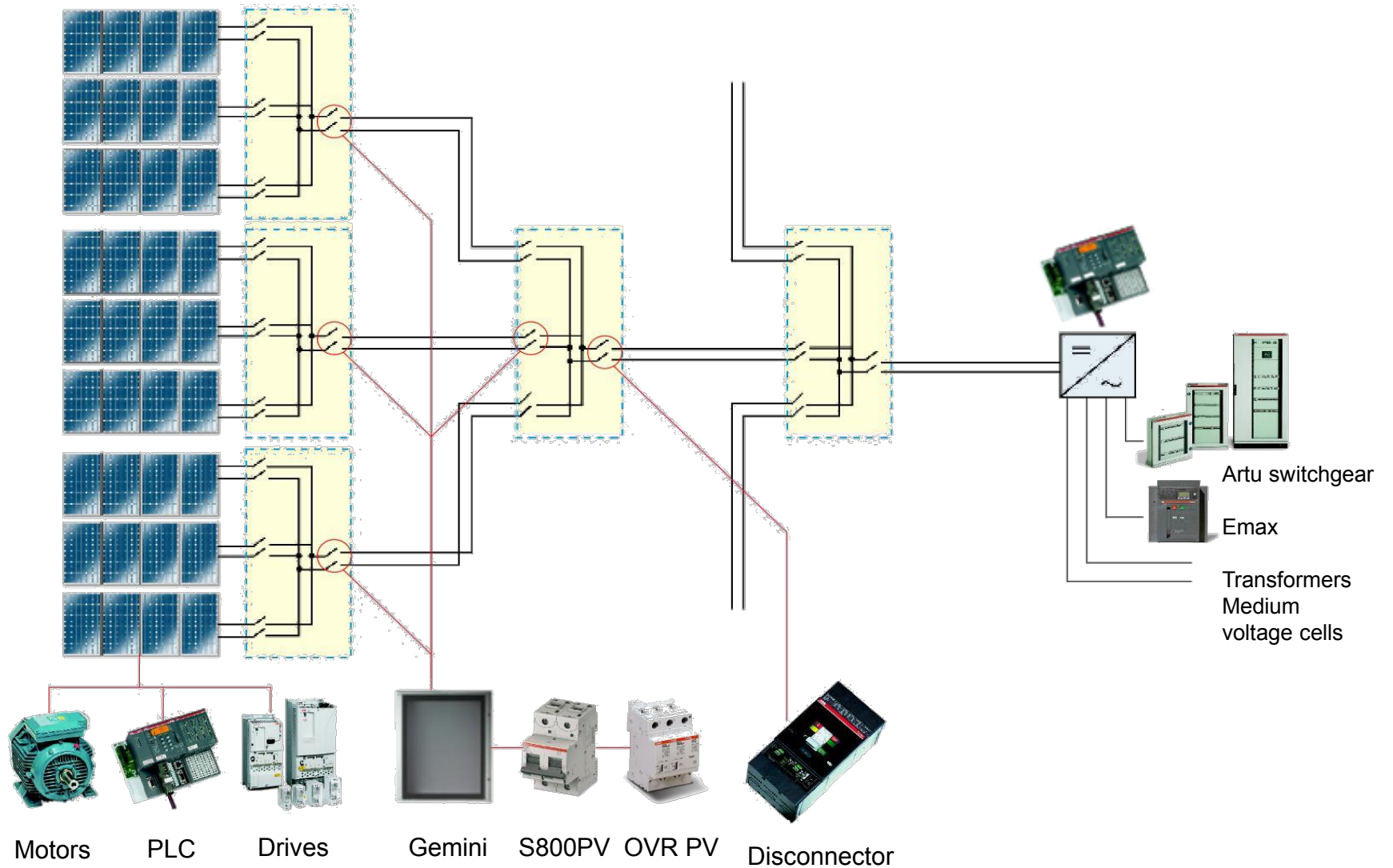
Shankar GS

ABB Automation for Solar Applications

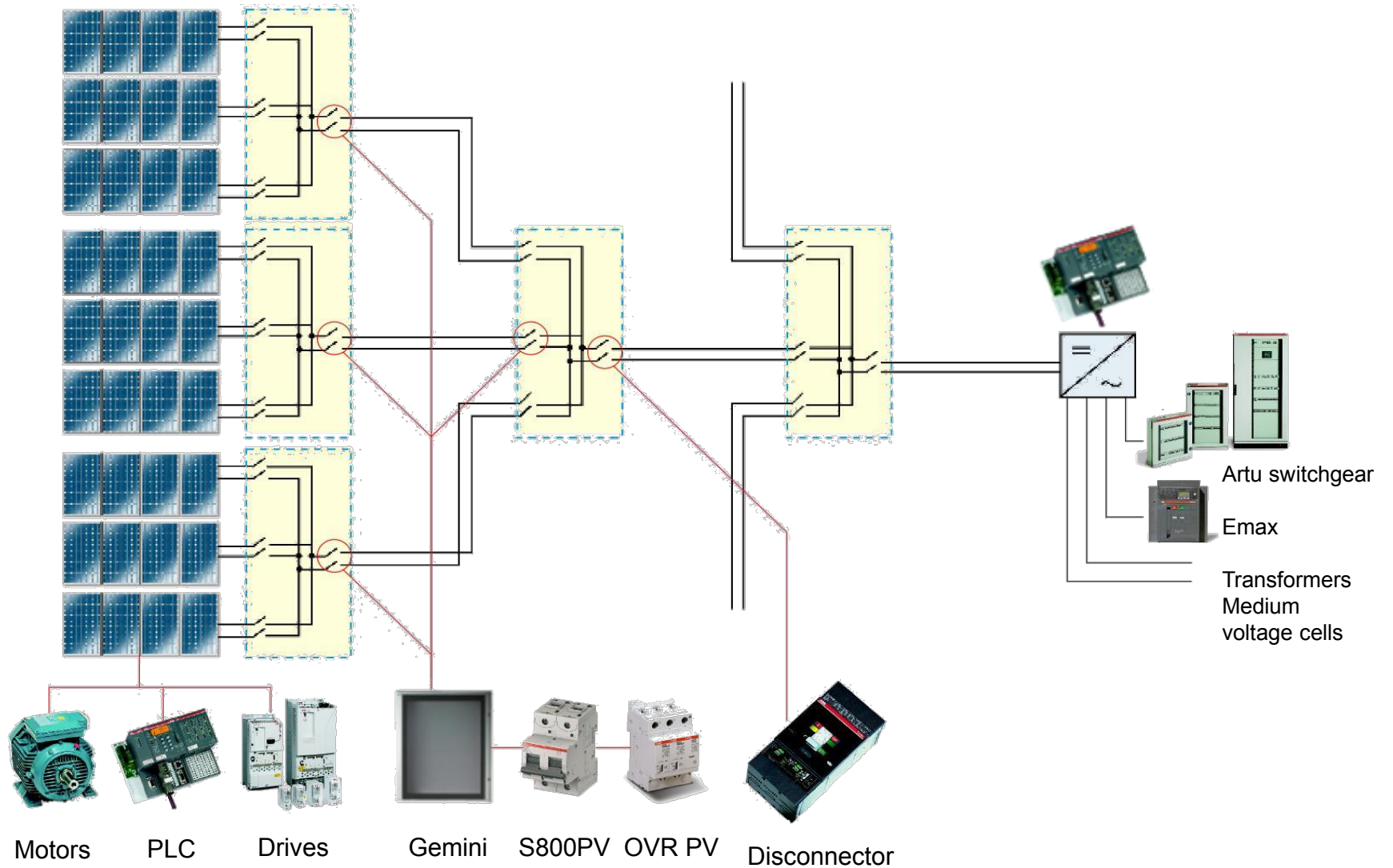
Technologies

- Photovoltaic
 - Tracking
 - Public
 - Private/Offgrid
- Thermal
 - Often hybrid
 - Heat /steam generation
- Now Trending...Hybrid
 - Off-Grid Private (or private microgrid)
 - Public- Utility connected

PV Technology

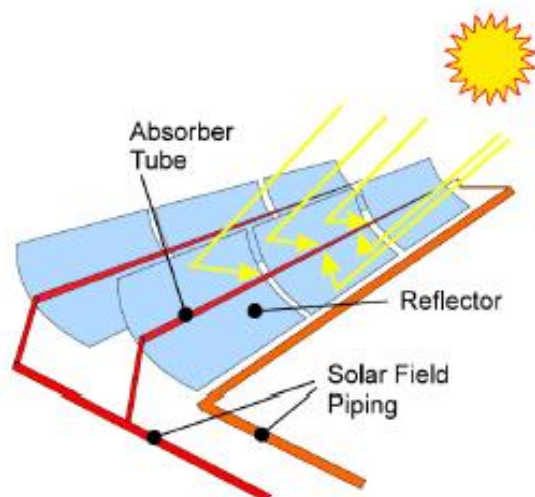


PV Technology



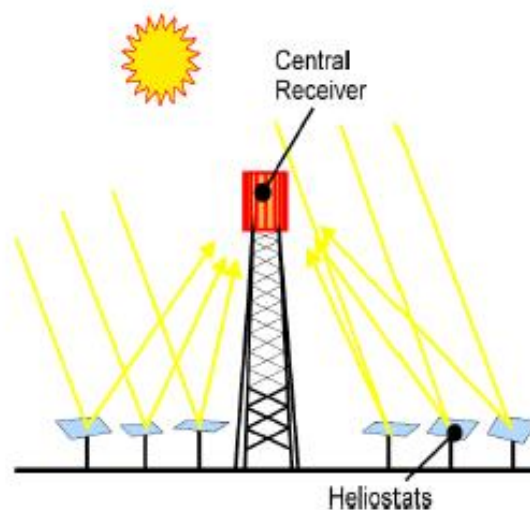
Thermosolar technology

Parabolic Trough



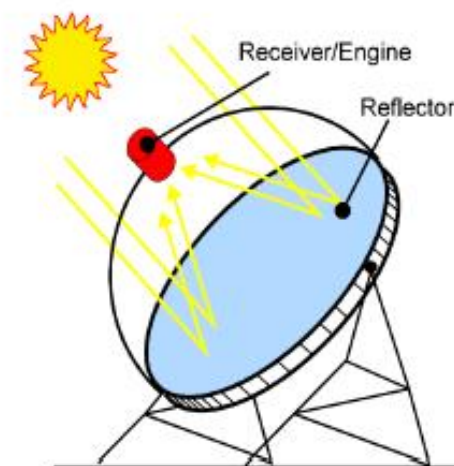
30 MW_{el} Kramer Junction, CA

Power Tower



10 MW_{el} Solar Two, Barstow, CA

Parabolic Dish



Plataforma Solar, Spain

Example of wiring diagram for a photovoltaic plant

Fix PV solution : Commercial or industrial applications

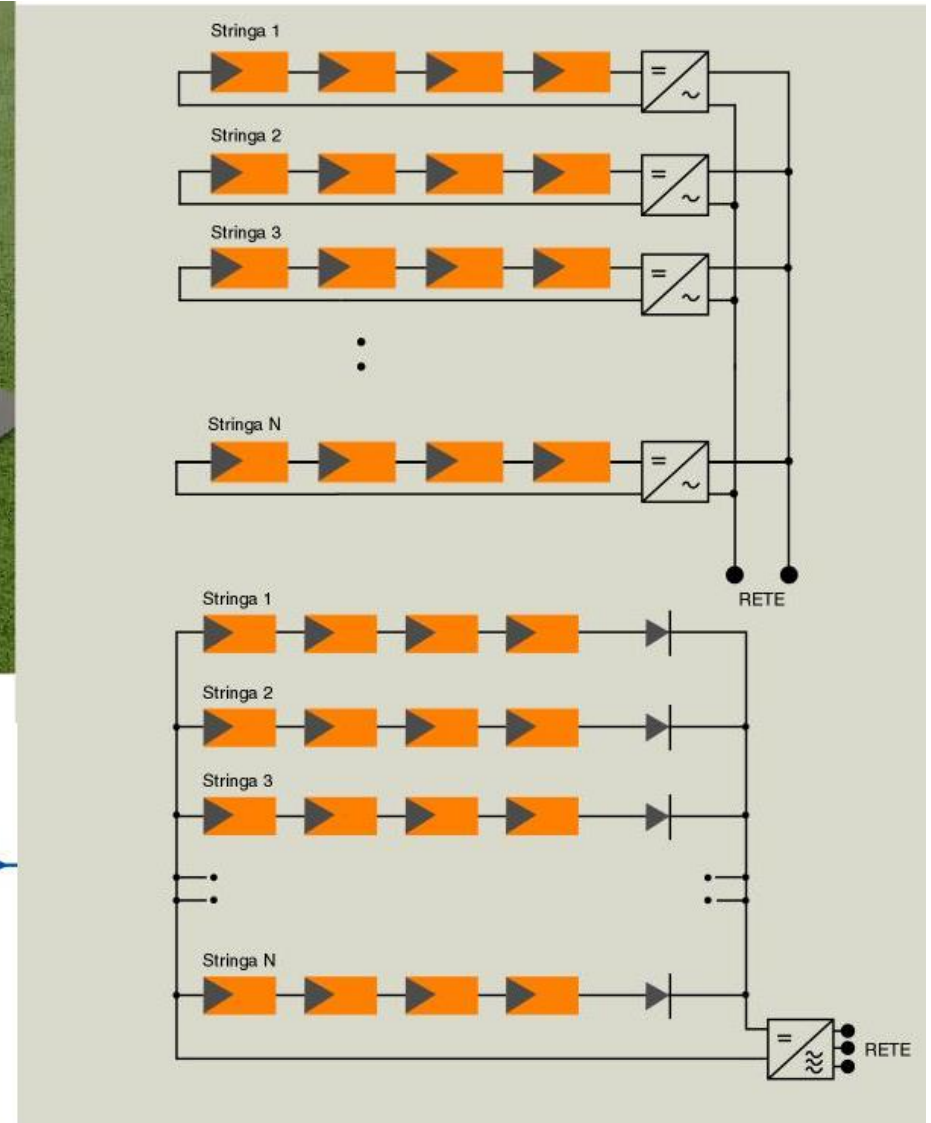
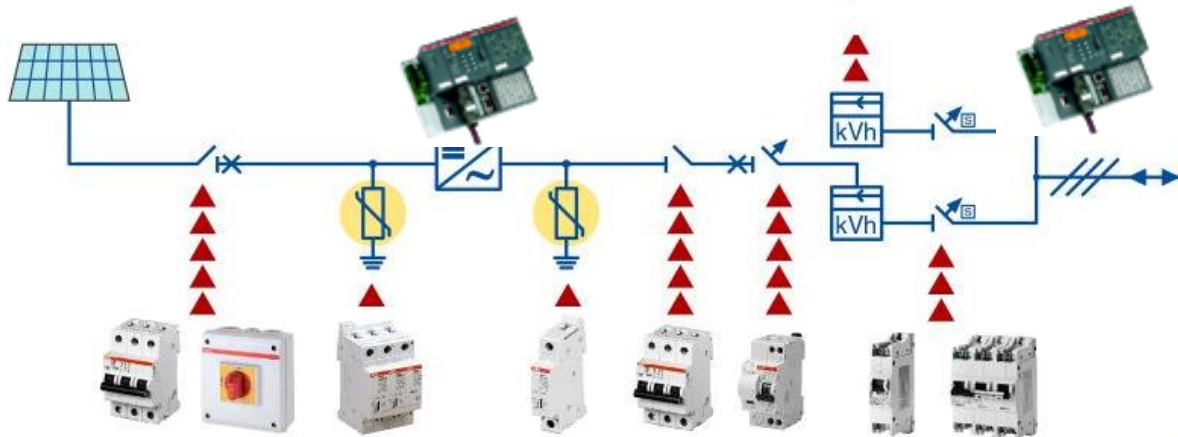
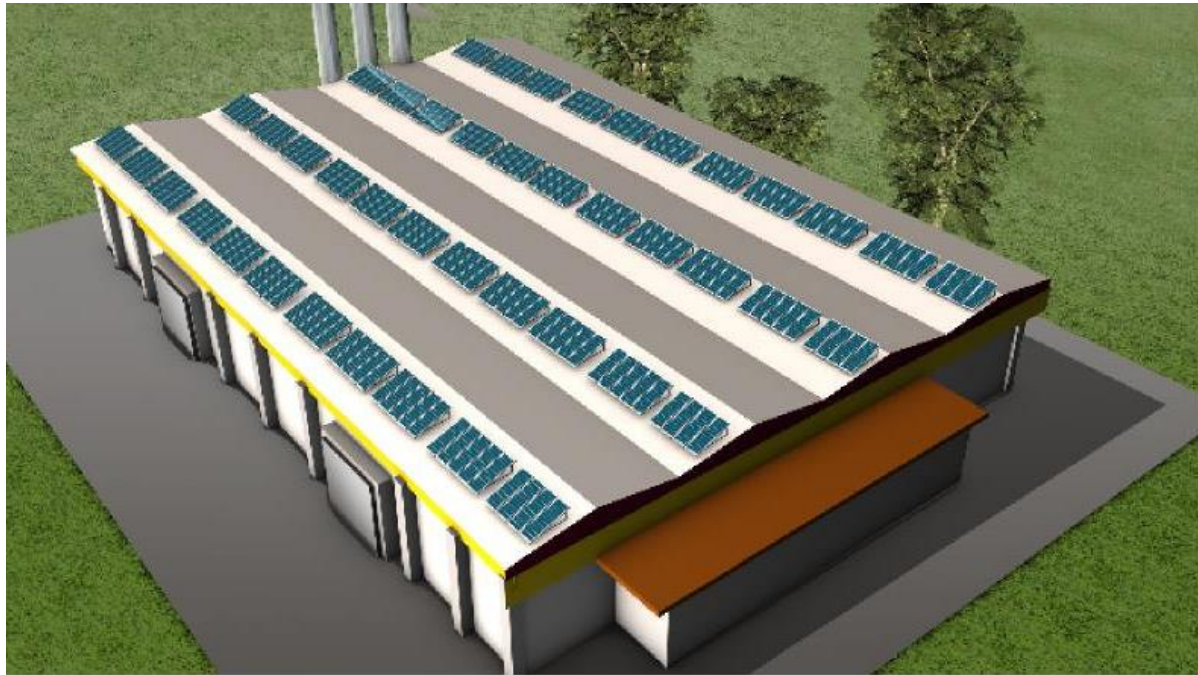


ABB PLC's, drives & motors for Tracker control

Modbus control or classic I/O control



ABB PLC AC500



Azimuthal and elevation control with ABB Drives

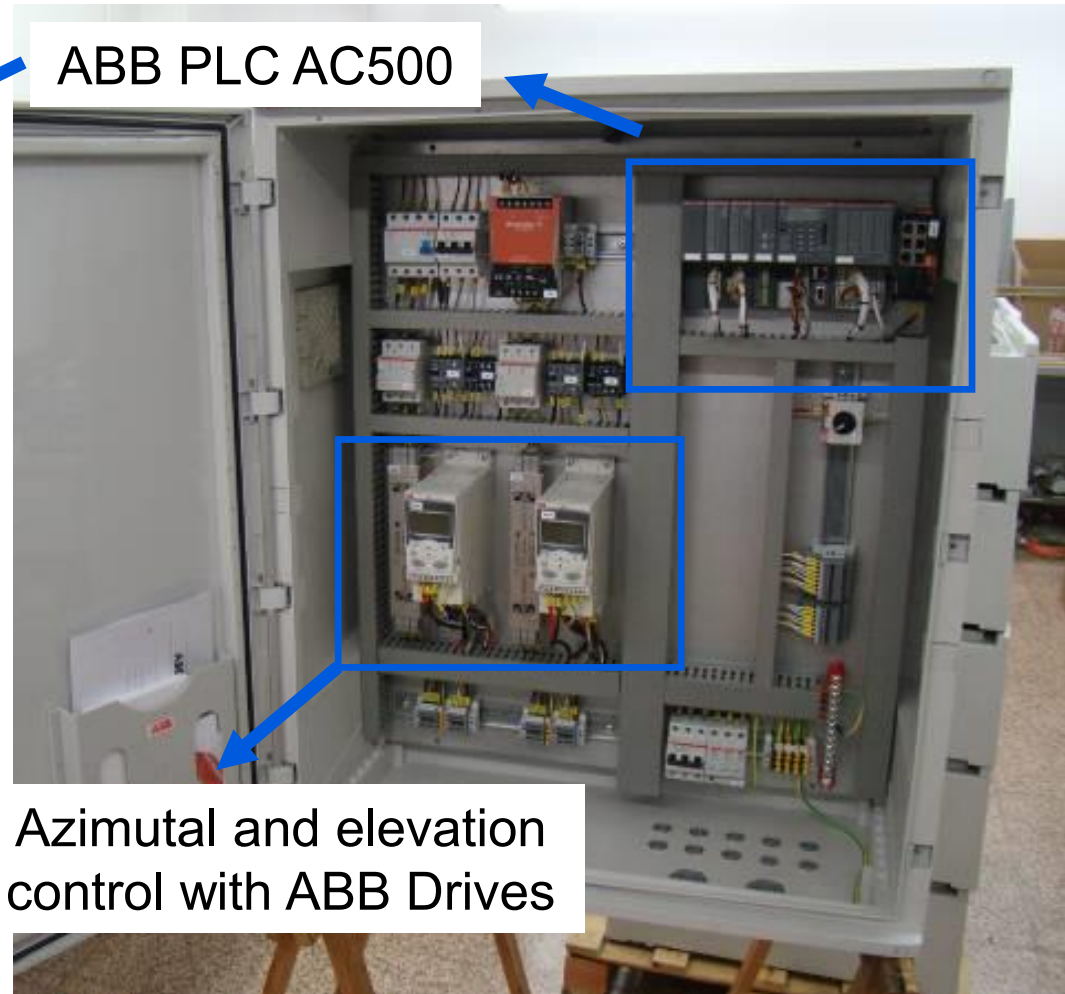


ABB PLC's, drives & motors for Tracker control

Advanced real time motion control protocols (ETHcat)

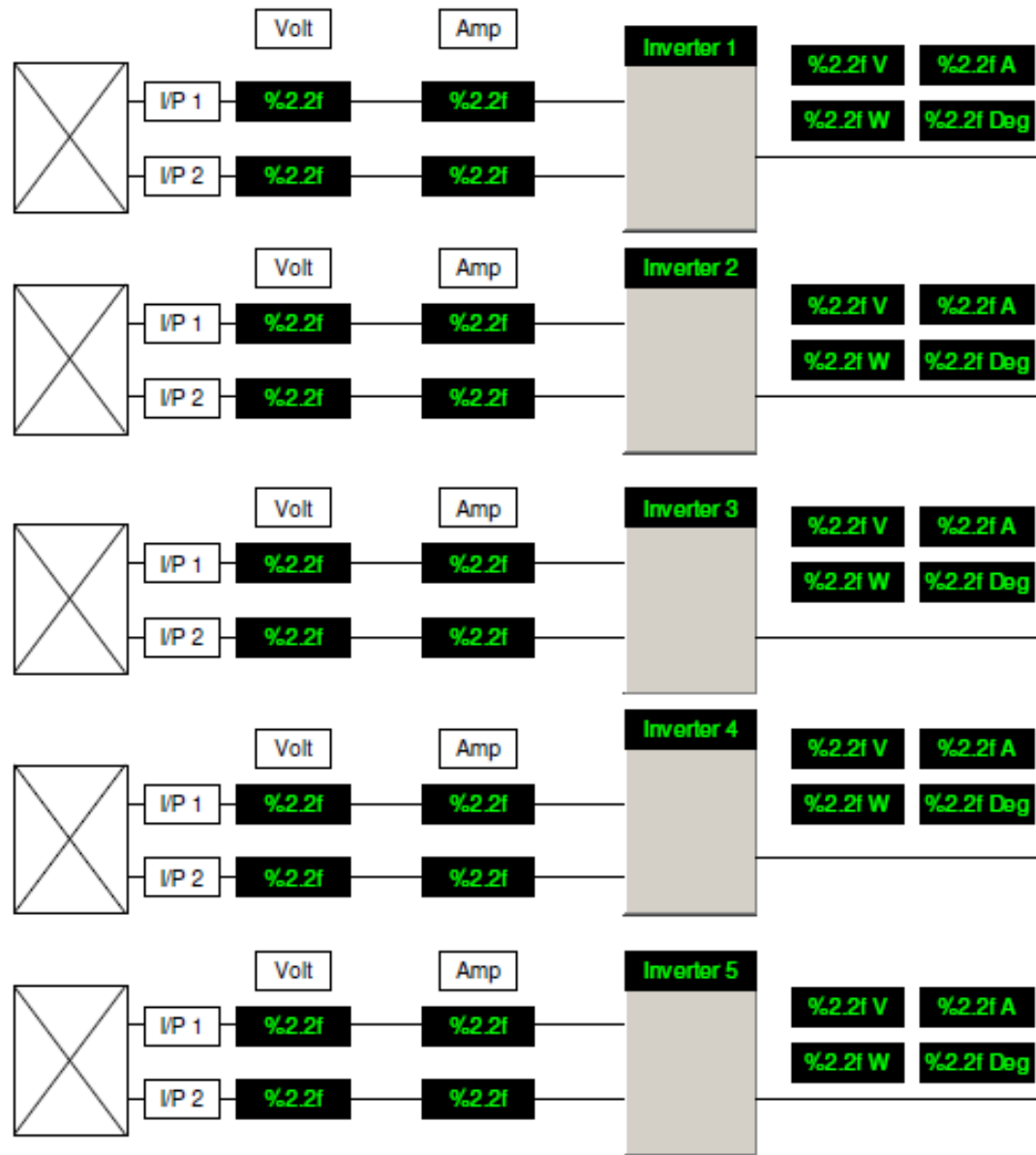


ABB PLC AC500

Azimuthal and elevation control with ABB Drives

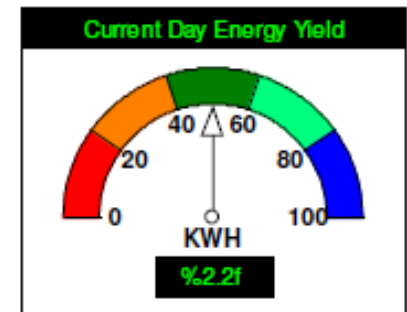
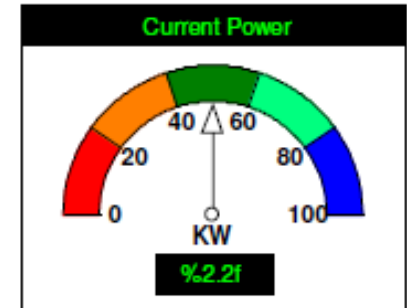


Inverters control integrated into PLC



Outdoor Temp
%2.1f Deg

Solar Radiance
%2.1f W/SqM



- [Example](#)

Basic atmospheric stations

- Basic atmospheric stations offering anemometer, thermometer, humidity sensor, pyranometer granting serial protocol communications which are easy to integrate into a PLC system or thru AI/DI signals
- Normally what is more used is :
 - Direct PLC I/O connexion
 - An anemometer giving a pulse 24Vdc output
 - Weather vane (wind vane) offering a 4-20ma output
 - Pyranometer offering 0-5V analogue output
 - PT 100 or PT1000 thermometer.



Anemometer



Wind vane

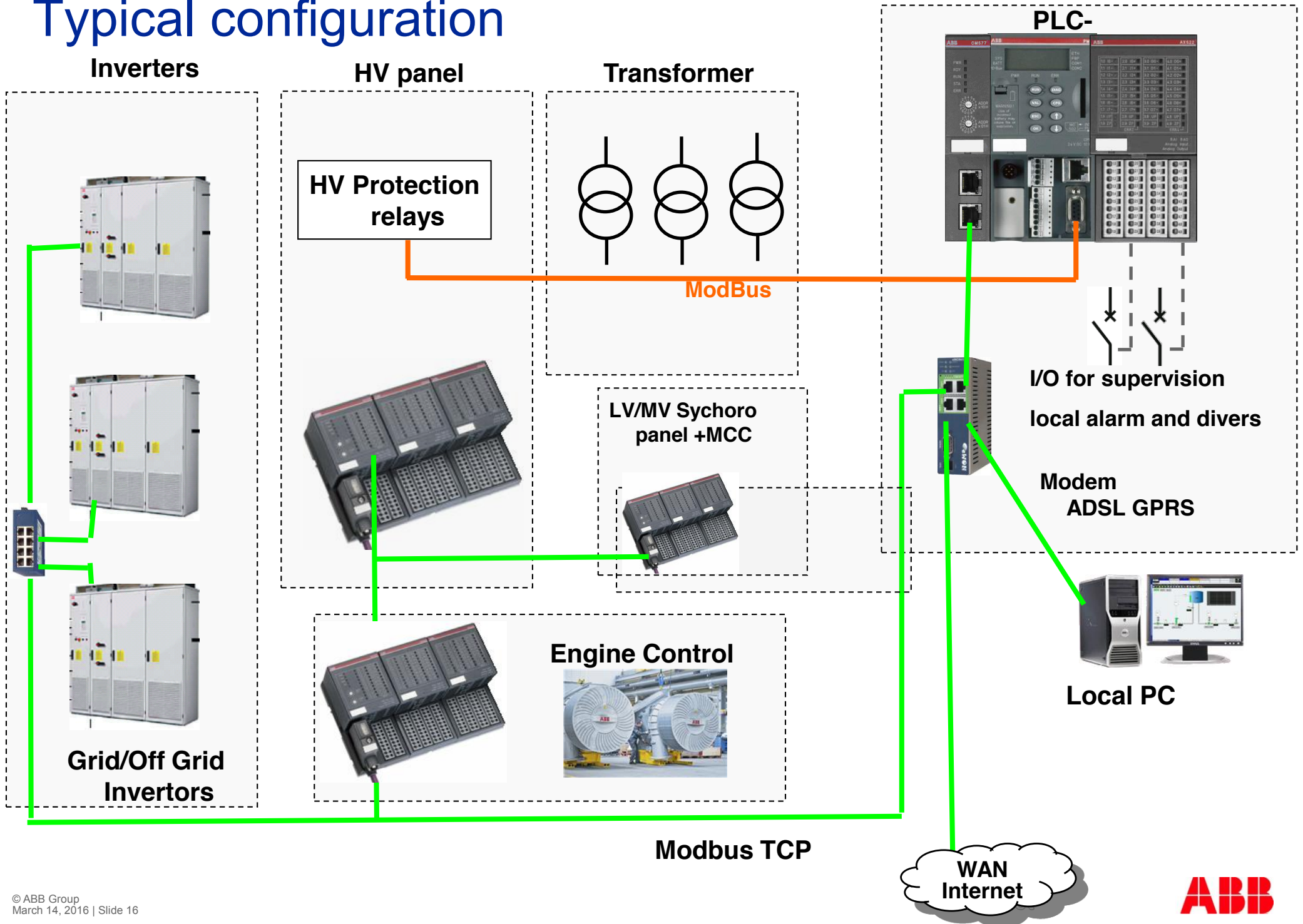


Pyranometer

Why & How Hybrid-Offgrid?

- **There is no “product” for this , but a solution based on actual requirements and can be scalable**
 - Existing grid is unreliable, or limited availability/expense
 - Public grid does not exist
 - Extensive/expensive /complex legal frame work
 - Fossil fuel/Hydrocarbons- environmental value/cost/availability
- **Real life cases**
 - Industrial user in remote area using power from Diesel/Gas engines, has big real estate on roof/ground, wants to invest in a PV plant.
 - Wants to optimize consumption, loads between public tariff, own diesel, solar generation . Be environmentally friendly and save money!

Typical configuration



Power and productivity
for a better world™

